



JUN 06 2011

Serial: HNP-11-056
10 CFR 50.73

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555

SHEARON HARRIS NUCLEAR POWER PLANT, UNIT 1
DOCKET NO. 50-400/RENEWED LICENSE NO. NPF-63
LICENSEE EVENT REPORT 2010-002-01

Ladies and Gentlemen:

The enclosed supplement to Licensee Event Report (LER) 2010-002-00 is submitted in accordance with 10 CFR 50.73, paragraph (a)(2)(iv)(A), an event or condition that resulted in manual actuation of the Reactor Protection System. This event is also reportable pursuant to 10 CFR 50.73(a)(2)(i)(B), a condition prohibited by Technical Specifications since the Main Steam Isolation (MSIV) was likely inoperable for a period of time longer than allowed by Technical Specifications, 10 CFR 50.73(a)(2)(v)(C), inability to isolate and mitigate a radioactive release, and 10 CFR 50.73(a)(2)(v)(D), a condition which could have prevented the fulfillment of a safety function to mitigate the consequences of an accident. This report describes an event in which an oil leak from the Hydrogen Seal Oil System required a manual reactor trip and a Main Steam Isolation Valve that failed to fully close.

This document contains no Regulatory Commitments.

Please refer any questions regarding this submittal to Mr. Dave Corlett, Supervisor - Licensing/Regulatory Programs, at (919) 362-3137.

Sincerely,

Ernest J. Kapopoulos Jr.
Plant General Manager
Harris Nuclear Plant

EK/jmd

Enclosure

cc: Mr. J. D. Austin, NRC Sr. Resident Inspector, HNP
Mrs. B. L. Mozafari, NRC Project Manager, HNP
Mr. V. M. McCree, NRC Regional Administrator, Region II

JE22
NRK

LICENSEE EVENT REPORT (LER)

(See reverse for required number of
digits/characters for each block)

Estimated burden per response to comply with this mandatory collection request: 80 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the Records and FOIA/Privacy Service Branch (T-5 F52), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to infocollects@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NE0B-10202, (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means used to impose an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

1. FACILITY NAME Harris Nuclear Plant - Unit 1	2. DOCKET NUMBER 05000400	3. PAGE 1 of 3
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4. TITLE

Manual Actuation of the Reactor Protection System due to Hydrogen Seal Oil Leak

5. EVENT DATE			6. LER NUMBER			7. REPORT DATE			8. OTHER FACILITIES INVOLVED		
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO.	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER	
11	15	2009	2010	- 002 -	01	06	07	2011	N/A	05000	
						FACILITY NAME N/A					DOCKET NUMBER 05000

9. OPERATING MODE

1

11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR§: (Check all that apply)

10. POWER LEVEL

100

- | | | | |
|---|---|--|--|
| <input type="checkbox"/> 20.2201(b) | <input type="checkbox"/> 20.2203(a)(3)(i) | <input type="checkbox"/> 50.73(a)(2)(i)(C) | <input type="checkbox"/> 50.73(a)(2)(vii) |
| <input type="checkbox"/> 20.2201(d) | <input type="checkbox"/> 20.2203(a)(3)(ii) | <input type="checkbox"/> 50.73(a)(2)(ii)(A) | <input type="checkbox"/> 50.73(a)(2)(viii)(A) |
| <input type="checkbox"/> 20.2203(a)(1) | <input type="checkbox"/> 20.2203(a)(4) | <input type="checkbox"/> 50.73(a)(2)(ii)(B) | <input type="checkbox"/> 50.73(a)(2)(viii)(B) |
| <input type="checkbox"/> 20.2203(a)(2)(i) | <input type="checkbox"/> 50.36(c)(1)(i)(A) | <input type="checkbox"/> 50.73(a)(2)(iii) | <input type="checkbox"/> 50.73(a)(2)(ix)(A) |
| <input type="checkbox"/> 20.2203(a)(2)(ii) | <input type="checkbox"/> 50.36(c)(1)(ii)(A) | <input checked="" type="checkbox"/> 50.73(a)(2)(iv)(A) | <input type="checkbox"/> 50.73(a)(2)(x) |
| <input type="checkbox"/> 20.2203(a)(2)(iii) | <input type="checkbox"/> 50.36(c)(2) | <input type="checkbox"/> 50.73(a)(2)(v)(A) | <input type="checkbox"/> 73.71(a)(4) |
| <input type="checkbox"/> 20.2203(a)(2)(iv) | <input type="checkbox"/> 50.46(a)(3)(ii) | <input type="checkbox"/> 50.73(a)(2)(v)(B) | <input type="checkbox"/> 73.71(a)(5) |
| <input type="checkbox"/> 20.2203(a)(2)(v) | <input type="checkbox"/> 50.73(a)(2)(i)(A) | <input checked="" type="checkbox"/> 50.73(a)(2)(v)(C) | <input type="checkbox"/> OTHER |
| <input type="checkbox"/> 20.2203(a)(2)(vi) | <input checked="" type="checkbox"/> 50.73(a)(2)(i)(B) | <input checked="" type="checkbox"/> 50.73(a)(2)(v)(D) | Specify in Abstract below
or in NRC Form 366A |

12. LICENSEE CONTACT FOR THIS LER

FACILITY NAME

John M. Doorhy Jr. - Licensing Specialist

TELEPHONE NUMBER (Include Area Code)

(919) 362-2137

13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT

CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX
D	TI	STR	Cuno Eng. Corp.	N	B	SB	ISV	----	N

14. SUPPLEMENTAL REPORT EXPECTED

☐ YES (If yes, complete 15. EXPECTED SUBMISSION DATE)☒ NO

15. EXPECTED SUBMISSION DATE

MONTH	DAY	YEAR

ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines)

On November 15, 2009, at 100% power, the Harris plant experienced a significant oil leak from the Hydrogen Seal Oil system. A non-licensed operator notified the Main Control Room (MCR) that the handle rotated each shift by Operations on the Air Side Seal Oil self-cleaning strainer became disconnected during manual rotation after approximately 1/4 turn, resulting in the oil leak. Based on this report and due to receipt of a "Turbine Lube Oil Reservoir Low Level" alarm, a decision was made to initiate a unit shutdown. The unit was manually tripped at 22:42 by the Main Control Room Operators. The plant promptly attained normal operation no-load temperature and pressure. Following the reactor trip, when the decision was made to break condenser vacuum, the "B" steam generator Main Steam Isolation Valve (MSIV) failed to fully close on demand from its control switch, but was closed due to field actions at 23:03 by locally isolating instrument air to the valve.

The root cause of the Hydrogen Seal Oil leak was that for past maintenance performed on the Air Side Seal Oil strainer, the Graded Approach to Planning and Scheduling instructions and Decision Tree was too generic. When considering the level of planning detail, the work coordination management procedure, WCM-006 does not provide guidance on considering the vulnerabilities to the plant as a result of the work being performed on the component. As a result, the thrust collars that hold the filter handle in place were not installed during past maintenance which allowed the filter handle to eject.

Immediate corrective actions were to stabilize the plant, and secure the Turbine Seal Oil/Lube Oil systems to stop the leak. Aqueous foam was sprayed on the oil to prevent a fire hazard. The oil was cleaned up and the Air Side Seal Oil strainer replaced. Planned corrective actions to prevent recurrence are to revise and implement WCM-006 such that Level "A" work activities (Quality Critical) are classified based on Equipment Classification that could cause a plant transient or shutdown and define other criteria for Level "A" (Quality Critical).

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CONTINUATION REPORT

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Energy Industry Identification System (EIS) codes are identified in the text within brackets [].

I. DESCRIPTION OF EVENT

There were no structures, systems, or components that were inoperable at the start of the event which could have contributed to the event. On November 15, 2009, at 100% power, the Harris plant experienced a significant oil leak from the Hydrogen Seal Oil system [TI]. A non-licensed operator notified the Main Control Room (MCR) that the handle rotated each shift by Operations on the Air Side Seal Oil self-cleaning strainer became disconnected during manual rotation after approximately 1/4 turn, resulting in the oil leak. Based on this report and due to receipt of a "Turbine Lube Oil Reservoir Low Level" alarm, a decision was made to initiate a unit shutdown. The unit was manually tripped at 22:42 by the Main Control Room Operators. The plant promptly attained normal operation no-load temperature and pressure. Following the reactor trip, when the decision was made to break condenser vacuum, the "B" steam generator Main Steam Isolation Valve (MSIV) [SB] failed to fully close on demand from its control switch, but was closed due to field actions at 23:03 by locally isolating instrument air to the valve. The handle rotated each shift by Operations on the Air Side Seal Oil self-cleaning strainer [STR] became disconnected during manual rotation after approximately 1/4 turn, resulting in the oil leak. Aqueous foam was quickly sprayed on the oil to prevent a fire hazard. The loss of approximately 9,500 gallons of lube oil to the 261 ft elevation of the turbine building occurred with a small amount reaching the nearby gravel. No oil reached the Harris Lake. The oil was cleaned up and the Air Side Seal Oil strainer replaced. The Hydrogen Seal Oil/Lube Oil system was replenished and the unit was returned to service on November 20, 2010, at 2020.

II. CAUSE OF THE EVENT

The root cause of this failure was that during past maintenance on the Air Side Seal Oil strainer, the Graded Approach to Planning and Scheduling procedure (WCM-006) instructions and Decision Tree was too generic. When considering level of planning detail, WCM-006 does not provide guidance on considering the vulnerabilities to the plant as a result of the work being performed on the component. This resulted in maintenance being performed on a critical component without the use of vendor drawings to validate that all parts are installed as designed. Troubleshooting indicated that the thrust collars that hold the filter handle in place were not installed during past maintenance, allowing the filter handle to eject.

The cause of the MSIV failing to fully close was determined to be two solenoid operated shuttle valves (SOVs) failing to fully realign to vent air after de-energizing. When both solenoids 1MS-82:007 SOV & 1MS-82:006 SOV are energized, both SOVs will open and supply air to the pilot operated 3-way valves. However, if either one of the two solenoids de-energizes (can be directed to do so manually from the MCB or automatically via RPS), the respective SOV will change state and exhaust the air supply from the pilot operators, closing the MSIV. 1MS-82:007 SOV was found to be stuck in its energized position and 1MS-82:006 SOV was found in an intermediate position. Since neither valve fully positioned, a portion of the air was trapped in the valve actuator, preventing the valve from fully closing. After Operators isolated instrument air to the MSIV per plant procedures, the valve went fully shut.

Based on the observations made during the disassembly of the SOVs, there were several conditions observed with the "1MS-82:007" SOV that could have influenced its failure. First, it is believed that the piston assembly of the "1MS-82:007" SOV was stuck due to the amount of force required to move it. There were deposits present on the core assembly and the bore of the solenoid base subassembly that could have possibly caused the "1MS-82:007" SOV to not change state on demand. No obvious conditions were identified with the "1MS-82:006" SOV that would have resulted in its failure.

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III. SAFETY SIGNIFICANCE

This event is being reported pursuant to 10 CFR 50.73(a)(2)(iv)(A), an event or condition that resulted in manual actuation of the Reactor Protection System. This event is also reportable pursuant to 10 CFR 50.73(a)(2)(i)(B), a condition prohibited by Technical Specifications since the MSIV was likely inoperable for a period of time longer than allowed by Technical Specifications, 10 CFR 50.73(a)(2)(v)(C), inability to isolate and mitigate a radioactive release, and 10 CFR 50.73(a)(2)(v)(D), a condition which could have prevented the fulfillment of a safety function to mitigate the consequences of an accident since closure of the valve would minimize a release. The actual consequences resulted in a manual reactor trip and spillage of large quantities of oil to the turbine building floor and some smaller amounts to the ground. No oil reached the Harris Lake. The manual reactor trip is bounded by the analysis in Chapter 15 of the Final Safety Analysis Report (FSAR). The operating staff performed the required actions for the trip and there were no adverse safety consequences.

Potential environmental consequences could have resulted if oil had reached the lake. Damage to plant equipment, and/or personal injury also could have occurred.

The MSIVs are designed to close within 5 seconds and performs a safety function to mitigate the consequences of a steam line break and a tube rupture. The failure of the MSIV to fully close occurred with the plant in Mode 3. Failure of the B MSIV to fully shut would have prevented isolation of the B Steam Generator. During the inoperable period, there was no identified tube leakage.

IV. CORRECTIVE ACTIONS

Immediate corrective actions were to stabilize the plant, and secure the Turbine Seal Oil/Lube Oil systems to stop the leak. Aqueous foam was sprayed on the oil to prevent a fire hazard. The oil was cleaned up and the Air Side Seal Oil strainer replaced.

Planned corrective actions to prevent recurrence are to revise and implement WCM-006, Graded Approach to Planning and Scheduling such that Level "A" work activities (Quality Critical) are classified based on Equipment Classification that could cause a plant transient or shutdown and define other criteria for Level "A" (Quality Critical). Planning Level "A" is used for tasks that require additional rigor in preparation, oversight and implementation because the task can significantly impact plant operation or equipment.

Corrective actions for the MSIV failing to fully close were to replace the SOVs on 1MS-82. One additional SOV installed on 1MS-80 ("A" MSIV), 1MS-80:007, was found to be of the same manufacturing lot as the stuck SOV on 1MS-82. Although no defect was observed with this SOV, it was also replaced.

V. PREVIOUS SIMILAR EVENTS

A review of License Event Reports for the previous five years did not reveal any similar events at the Harris Plant.